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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/749,774

12/30/2003

Anders Grunnet-Jepsen

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12/14/2005

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EXAMINER

PENG, CHARLIE YU

ART UNIT

PAPER NUMBER

2883

DATE MAILED: 12/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/749,774

Applicant(s)

GRUNNET-JEPSEN ET AL.

Examiner

Charlie Peng

Art Unit

2883

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-48 is/are pending in the application.
- 4a) Of the above claim(s) 9-16 and 26-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 17-25 and 39-48 is/are rejected.
- 7) ☒ Claim(s) 22-25 and 45 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Specie B, claims 17-25 and 39-48 in the reply filed on 14 November 2005 is acknowledged. Claims 1-8 have been canceled by the applicant, and claims 9-16 and 26-38 have been withdrawn from consideration.

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "frequency adjustment circuit" in claims 22-25 must be shown or the feature(s) canceled from the claims; changing a length of an arm of a Sagnac interferometer to adjust the phase in claim 45 must be shown or the feature(s) canceled from the claim. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The specification is objected to because of the following informalities: The "frequency adjustment circuit" was not disclosed in any part of the Disclosure submitted; changing a length of an arm of a Sagnac interferometer to adjust the phase was also not disclosed in any part of the Disclosure submitted. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 22-25 and 45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The "frequency adjustment circuit" was not disclosed in any part of the Disclosure submitted; changing a length of an arm of a Sagnac interferometer to adjust the phase was also not disclosed in any part of the Disclosure submitted.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-19, and 41-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,836,621 to Bendelli. Bendelli teaches an OADM comprising a Sagnac interferometer structure 5 having a tunable Bragg grating 2 inserted therein, a phase control element 7 coupled with the interferometer 5, and wherein the grating is tuned in such a way as to allocate the spectral response to the new channel (signal) to be extracted (dropped) or inserted (added). (See at least Fig. 1 and description) Although Bendelli does not specifically state that the phase control element 7 controls the power of the signal, Bendelli teaches that by introducing a phase shift through the phase control element 7, a constructive or destructive interference will occur. Since constructive/destructive interference can be adjusted to control the power of the signal, (a fact also noted by the applicant in the Disclosure [0026]) it would be obvious to one of ordinary skill in the art at the time the invention was made to use the phase control element to control the power of the signal in combination with the rest of the component of the OADM. The motivation would be to eliminate the limitation of the tuning range arising from the constraint of not interfering with the channels in transit during the transient.

With specific reference to claim 19, Bendelli teaches the Bragg grating defines a Fabry-Perot cavity and that tuning can be carried out by means of a voltage command i.e., electronically modulated. (See column 4, paragraph 4, and Summary of Invention)

With specific reference to claim 42-44, 46 and 47, Bendelli teaches that a grating can easily be tuned by thermal stress (heating the waveguide) or by application of mechanical stress (physically changing the grating periods). Furthermore, when a Bragg grating is axially strained, the Bragg wavelength shifts because the grating spacing changes and because of a photoelastic induced change in the refractive index. (See conclusion for reference on this effect) Since the grating is part of the interferometer, claims 46 and 47 are also rejected.

With specific reference to claim 45, it is unclear to the examiner what is claimed as the Sagnac interferometer appears to have only one loop (or one arm), as opposed to an MZI interferometer, which has two arms. MZI interferometers operates due to the different path lengths in their two arms.

Claim 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bendelli in view of U.S. Patent 4,442,750. Bendelli teaches the OADM with a Sagnac interferometer and a phase controller except for how phase adjustment is accomplished. It is well known in the art to use thermal or stress means to phase-modulate light in an optical fiber. Bowley phase-modulates light caused by pressure/piezoelectric variations or other interactions of various energy forms (magnetic, RF, thermal/heater) on specially coated fibers, as sensed through known

fiber optic interferometric techniques. (See at least column 4, paragraph 3) It would have been obvious to one of ordinary skill in the art at the time the invention was made to include any of such well-known phase-modulation means in Bendelli's invention. The motivation would be that using well-known and well-practiced techniques reduces experimental uncertainties and/or manufacturing cost.

Claims 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bendelli in view of U.S. Patent 4,898,468 to Udd. Bendelli teaches the OADM with a Sagnac interferometer and a phase controller except for a frequency adjustment circuit. Udda teaches phase modulator 17 and a frequency shift 19 in a Sagnac interferometer implemented with a fiber, which creates optical effect from thermal elongation of the fiber (heater) or shifts due to strain (piezoelectric). (See at least Fig. 1 and description) Temperature increases will also cause optical fiber 21 to experience an optical pathlength change. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the frequency shifter in Bendelli's OADM. The motivation would be that by comparing the output of the system with the frequency shifter switched in the "off" and "on" position dependent and position independent modes, the location as well as the magnitude of a disturbance may be deduced.

With specific reference to claim 25, although Bendelli does not specifically speak of a "hitless" OADM, Bendelli and Udd combine to teach the OADM apparatus having the Sagnac interferometer with the frequency shifter and it must be able to at least perform the same. Furthermore, Bendelli stated that "Tuning of the wavelength selector is changed, so it has second wavelength and phase shift properties such that the entire

stream of optical signals is coupled from an input port to an output port via the tunable wavelength selector, and the extracting and inserting operation is not performed while the tuning is changed". (Abstract) This is consistent with not inadvertently block a channel that should not be dropped as disclosed by the applicant.

Claims 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bendelli in view of U.S. Patent 5,999,292 to Dennis. Bendelli teaches the OADM with a Sagnac interferometer and a phase controller wherein a multiplexed stream enters through the port 1A of the circulator 1 and leaves this circulator through the port 1B, while the tuning channel can be extracted and inserted through the ports 3A and 3B respectively of the circulator 3. Bendelli does not teach a plurality of such Sagnac interferometers. Dennis teaches demultiplexer comprising a plurality of Sagnac interferometers 14 connected in series wherein each interferometer is driven by a single microwave frequency through a phase modulator 19. (See at least Fig. 1 and description) It would have been obvious to one of ordinary skill in the art at the time the invention was made integrate Bendelli's OADMs as part of the demultiplexer. The motivation would be to provide a device that utilizes only electronic power and control signals and requires no short latency optical power.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

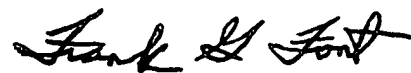
U.S. Patent 5,319,435 to Melle et al, on effects on Bragg wavelength by mechanical strain and refractive index, the whole application, particularly column 3, lines 36-47.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charlie Peng whose telephone number is (571) 272-2177. The examiner can normally be reached on 9 am - 6 pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charlie Peng
December 8, 2005



Frank G. Font
Supervisory Patent Examiner
Technology Center 2800